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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,766	12/09/2003	Reid Edmund Tatge	TI-35556 (1962-06900)	4307

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EXAMINER	
WANG, BEN C	
ART UNIT	**PAPER NUMBER**
2192	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/731,766	TATGE ET AL.	
	Examiner	Art Unit	
	Ben C. Wang	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-18 are pending in this application and presented for examination.

Claim Rejections – 35 USC § 102(a)

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(a) that form the basis for the rejections under this section made in this office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1-4, 7-8, 11-12, and 15-16 are rejected under 35 U.S.C. 102(a) as being anticipated by T. Okada (Pat. No. US 7,114,151 B2) (hereinafter 'Okada')

4. **As to claim 1**, Okada discloses a code generating system, comprising: a compiler that receives source code (Fig. 9, steps of 'source program', S1 – compiler; Col. 6, Lines 59-63) and generates an object file comprising object code (Fig. 9, step of 'assembly language code optimizer') and intermediate code (Fig. 10, step of S11 – generate intermediate code); a code optimizer coupled to the compiler (Fig. 9, step of S2 – code optimizer; Fig. 10, steps of S12 through S18 – code optimization) and a linker that receives the object file comprising object code and intermediate code (Fig. 9, step of S4 – linker; Col. 7, Lines 5-9) and provides the intermediate code to the code optimizer (Fig. 10, step of S11 – generate intermediate code; Col. 7, Lines 36-37; Fig.

12 - a flow of operations made in generation of the intermediate code; Col. 7, Lines 12-20).

5. **As to claim 8**, Okada discloses a method to optimize a program consisting of a plurality of source files (Fig. 9, steps of 'source program'), the method comprising: producing intermediate code associated with one or more of the plurality of source files (Fig. 10, step of S11 – generate intermediate code); producing object code associated with one or more of the plurality of source files (Fig. 9, step of 'assembly language code optimizer'); merging the intermediate code and the object code associated with each source file into an object file comprising object code plus intermediate code (Fig. 10, step of S11 – generate intermediate code, steps of S12 through S18 – code optimization); and optimizing the program by providing the intermediate code in the object file to a code optimizer (Fig. 9, step of S2 – code optimizer; Fig. 10, step of S11 – generate intermediate code, steps of S12 through S18 – code optimization; Col. 7, Lines 12-20).

6. **As to claim 12**, Okada discloses a storage medium containing instructions that are executed by a processor and comprising: instructions that produce intermediate code from one or more source files (Fig. 10, step of S11 – generate intermediate code); instructions that produce object code from one or more source files (Fig. 9, step of 'assembly language code optimizer'); instructions that merge the intermediate code and the object code associated with one of the source files into a single intermediate plus

object code file (Fig. 10, step of S11 – generate intermediate code, steps of S12 through S18 – code optimization); and instructions that provide the intermediate code contained in the single intermediate plus object code file to a code optimizer (Fig. 9, step of S2 – code optimizer; Fig. 10, step of S11 – generate intermediate code, steps of S12 through S18 – code optimization; Col. 7, Lines 12-20).

7. **As to claim 16**, Okada discloses a computer system, comprising: a processor, memory coupled to the processor; a code generating system stored in the memory and executable on the processor and that produces intermediate code (Fig. 10, step of S11 – generate intermediate code) and object code (Fig. 10, S18 – generate assembly language code) that is stored into a single intermediate plus object code file and provided to a code optimizer (Fig. 9, step of S2 – code optimizer; Fig. 10, step of S11 – generate intermediate code, steps of S12 through S18 – code optimization; Col. 7, Lines 12-20).

8. **As to claim 2**, Okada discloses the code generating system wherein the code optimizer produces optimized intermediate code (Fig. 10, element S11 – Generate Intermediate Code; Fig. 12, element S11-2; Fig. 13) that has been processed by a optimization algorithm (Fig. 10, elements S12 through S18; Fig. 15 – generation of the label code; Fig. 17 – generation of the floating-point register usage code; Fig. 21 – register usage code analysis; Fig. 26 – floating-point register renaming).

9. **As to claim 3**, Okada discloses the code generating system wherein the linker produces executable code (Fig. 9, steps of S4, 'Execute Form').

10. **As to claim 4**, Okada discloses the code generating system wherein the linker sends only portions of the intermediate code to the code optimizer (Col. 16, Lines 55-65; Col. 17, Lines 13-15).

11. **As to claim 7**, Okada discloses the code generating system wherein the object files comprising object code and intermediate code may comprise a library (Col. 1, Line 65 through Col. 2, Line 3; Col. 2, Lines 20-34; Col. 2, Line 65 through Col. 3, Line 8).

12. **As to claim 11**, Okada discloses the method wherein optimizing the program further comprises receiving optimized intermediate code from the code optimizer (Fig. 10, step of S11 – generating intermediate code) and producing optimized executable code (Fig. 10, step of 'assembly language code).

13. **As to claim 15**, Okada discloses the storage medium wherein the instructions that produce intermediate code to a code optimizer (Fig. 10, step of S11 – generating intermediate code) further comprises instructions for producing optimized object code (Fig. 10, step of 'assembly language code).

Claim Rejections – 35 USC § 103(a)

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made

15. Claims 5-6, 9-10, 13-14, and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada in view of Imai et al., (Pat. No. US 6,367,076 B1) (hereinafter 'Imai')

16. **As to claim 5, 10, 14, and 18**, Okada does not disclose the computer system wherein the intermediate code produced by the code generating system is stored into non-volatile memory.

However, in an analogous art of compiling method and memory storing the program code, Imai discloses the computer system wherein the intermediate code produced by the code generating system is stored into non-volatile memory (Col. 6, Lines 61-62 – the resulting intermediate codes are stored into main memory or a storage device).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Okada and the teachings of Imai to further provide the computer system wherein the intermediate code produced by the code generating system is stored into non-volatile memory in Okada system.

The motivation is that storing intermediate code into main memory or a storage device further provides an efficient means for the subsequent processes of code

optimization, i.e. flow analyzer, data dependency analyzer, code allocator etc., as once suggested by Imai (e. g., Col. 6, Line 55 through Col. 7, Line 17).

17. **As to claim 6, 9, 13, and 17**, Okada does not disclose the computer system wherein the intermediate code produced by the code generating system is stored into a magnetic storage device.

However, in an analogous art of compiling method and memory storing the program code, Imai discloses the computer system wherein the intermediate code produced by the code generating system is stored into a magnetic storage device (Col. 6, Lines 61-62 – the resulting intermediate codes are stored into a storage device).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to combine the teachings of Okada and the teachings of Imai to further provide the computer system wherein the intermediate code produced by the code generating system is stored into a magnetic storage device in Okada system.

The motivation is that storing intermediate code into main memory or a storage device further provides an efficient means for the subsequent processes of code optimization, i.e., flow analyzer, data dependency analyzer, code allocator etc., as once suggested by Imai (e. g., Col. 6, Line 55 through Col. 7, Line 17).

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Y. Ota, *Compiler, Method of Compiling and Program Development Tool* (Pub. No. US 2004/0243988 A1)
- Odnert et al., *Method and Apparatus for Compiling Computer Programs with Inter-procedural Register Allocation* (Pat. No. 5,428,793)
- Wu et al., Method, Apparatus, and System To Optimize Frequently Executed Code and To Use Compiler Transformation and Hardware Support To Handle Infrequently Executed Code (Pat. No. US 6,964,043 B2)

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben C. Wang whose telephone number is 571-270-1240. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TUAN DAM
SUPERVISORY PATENT EXAMINER

BCW BW

February 18, 2007